



10/A
1/14/03
MullisL

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Angelo Mascarenhas)

Serial No. 09/841,691)

Filed: April 24, 2001)

Title: ISOELECTRIC CO-DOPING)

Art Unit: 2815

Examiner: Jerome Jackson, Jr.

Atty. Dkt. No. NREL 99-80

TC800 MAIL ROOM

DEC - 2 2002

RECEIVED

AMENDMENT

In response to the office action dated July 19, 2002, the applicant wishes to amend the above-identified patent application, as shown below:

IN THE SPECIFICATION:

N.E. Please replace the paragraph beginning on page 3, line 12, with the following:

Another specific object of this invention is to fabricate and tailor semiconductor materials for active layers of LED's and laser diodes with bandgaps that produce light in wavelengths that are particularly suitable for fiber optic transmission, such as 1.55 μm or 1.3 μm and which are lattice matched to common semiconductor substrate materials, such as Si or GaAs.

NE. Please replace the paragraph beginning on page 6, line 9, with the following:

An example high efficiency, monolithic, quadruple junction, solar cell 10 constructed according to the principles and by a method of this invention is shown diagrammatically in Figure 1. An active, light-absorbing cell 12 comprising a dilute alloy of $\text{GaAs}_{1-x-y}\text{N}_x\text{Bi}_y$ (sometimes abbreviated as GaAs:N:Bi) with a bandgap of about 1.05 eV is positioned between a Ge cell 11 (bandgap of 0.67 eV) and a GaAs cell 13 (bandgap of 1.42 eV) in the monolithic, quadruple junction, solar cell 10, which also has a InGaP cell 14 (bandgap of 1.90 eV) overlaying the GaAs cell 13 and a Ge substrate 15, which is doped to provide a n-p junction 21 as the bottom Ge cell 11. Of course, the solar cell 10 also has a conventional bottom contact layer 16 and top grid 17 to facilitate electrical connection of the cell 10 into a circuit (not shown). Other conventional features, such as anti-reflective (A.R.) coating 19,

EXMR:

pages
N on
Corresponding
TO Spec.